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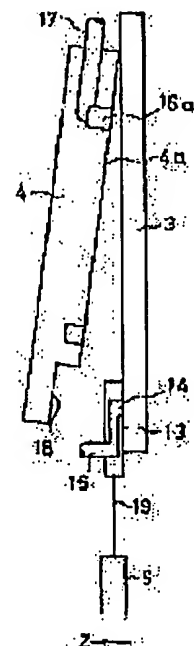
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## (54) SAMPLE CARRYING DEVICE

(57)Abstract:

**PURPOSE:** To obtain a sample carrying device which can attach and detach samples placed on a plate to and from a chuck device without being influenced by the parallelism when the samples are attached to and removed from the chuck device.

**CONSTITUTION:** This sample carrying device which carries samples (for example, wafers) 3 from a prescribed position to a chuck device 4 is provided with a holding section 13 which holds the samples 3 in a freely attachable and detachable state, carrying means which moves the samples 3 from the prescribed position to the device 4, connecting section (carrying arm) 9 which connects the section 13 with the carrying means, and elastic body (plate spring) 19 which is interposed in at least part of the section 9.



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**CLAIMS**

[Claim(s)]

[Claim 1] The sample transport device characterized by coming to have the elastic body placed between the connection section which connects between the attaching part which holds a plate-like sample for said sample in the sample transport device which conveys even chuck equipment from a predetermined location, enabling free attachment and detachment, a conveyance means for said position to said chuck equipment to move said sample, and said attaching parts and said conveyance means, and a part of said connection section [ at least ].

[Claim 2] It is the sample transport device according to claim 1 which said connection section is constituted including the arm section attached in said conveyance means, and is characterized by arranging said elastic body between said arm sections and said attaching parts.

[Claim 3] It is the sample transport device according to claim 1 which said connection section is constituted including the arm section attached in said conveyance means, and the plate-like ring member connected with said direction of an attachment-and-detachment side and parallel of said sample to this arm section, and is characterized by arranging said elastic body between said arm sections and said ring members.

[Claim 4] Said elastic body is a sample transport device according to claim 1 characterized by being easy to deform and consisting of other directions in said direction of an attachment-and-detachment side of said sample.

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**DETAILED DESCRIPTION**

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the sample transport device for conveying a plate-like sample to a predetermined location.

[0002]

[Description of the Prior Art] For example, as an aligner used in case a VLSI is manufactured, development of the X-ray aligner using the X-ray discharged from SOR (synchrotron radiation) as an exposure light is furthered. In this kind of X-ray aligner, the exposure imprint of a circuit pattern with a line breadth of 0.2 micrometers or less is possible. The outline of the conventional common above-mentioned X-ray aligner is shown in drawing 10.

[0003] That is, it has the wafer table 2 which consists of migration and each pivotable stage separately, respectively in the direction of X, the direction of Y, a Z direction, and the direction of theta, and the wafer chuck (chuck section) 4 which holds the semi-conductor wafer (plate-like member) 3 free [ attachment and detachment ] by vacuum adsorption is formed in the front face of this wafer table 2 at the wafer stage stand 1.

[0004] So that the mask (plate-like member) 5 with which the circuit pattern was drawn on the location which, on the other hand, meets the semi-conductor wafer 3 held by said wafer chuck 4 may be located Where it had the mask stand 7 which attached the mask 5 through the mask chuck (chuck section) 6 and the semi-conductor wafer 3 is held by said wafer chuck 4 Positioning of the X, Y, Z, and the direction of theta of the semi-conductor wafer 3 is performed, and the exposure imprint of the circuit pattern drawn on the mask 5 is carried out on the semi-conductor wafer 3 by making into the source of exposure the X-ray emitted from SOR.

[0005] Furthermore, between the wafer stage stand 1 and the mask stand 7, the wafer transport device 8 for conveying the semi-conductor wafer 3 and making the wafer chuck 4 detach and attach is arranged. This wafer transport device 8 mainly consists of an arm 9 for conveyance prolonged in the direction of a vertical which holds the semi-conductor wafer 3 by vacuum adsorption, the Z direction loader 10 and the direction loader 11 of X made to move this arm 9 for conveyance in a Z direction and the direction of X (for it to be perpendicularly to space) by the motor, a piezoelectric device, etc., and a rail 12 which plays a role as guidance at the time of moving this direction loader 11 of X in the direction of X.

[0006] With this kind of X-ray aligner, the wafer chuck 4 and the mask chuck 6 serve as a vertical mold, and the attachment and detachment to the wafer chuck 8 of the semi-conductor wafer 3 are performed here by [ as being shown in drawing 11 ].

[0007] That is, while the attaching part 13 held for the lower rear face of the semi-conductor wafer 3 to the upper limit of said arm 9 for conveyance, enabling free attachment and detachment is connected [ one ] and the vacuum adsorption slot 14 is established in this attaching part 13, the pipe 15 for evacuation is connected to the end of this vacuum adsorption slot 14. On the other hand, almost similarly [ said wafer chuck 4 ], while the vacuum adsorption slot 16 is established in this chuck side 4a in the shape of a ring, the pipe 17 for evacuation is connected to the end of this vacuum adsorption slot 16.

[0008] And adsorption maintenance was carried out at the attaching part 13 of the arm 9 for conveyance, and the semi-conductor wafer 3 was conveyed from the position to the chuck location of the front face of the wafer chuck 4 in the direction of X by the direction loader 11 of X, after an appropriate time, was conveyed by the Z direction with the Z direction loader 10, and was made as [ carry out / at chuck side 4a of the wafer chuck 4 / vacuum maintenance ].

[0009] In addition, the notch 18 for the attaching part 13 of said arm 9 for conveyance entering, and delivering the semi-conductor wafer 3 convenient is formed in the surface lower part of said wafer chuck 4.

[0010] However, since the arm 9 for conveyance and the attaching part 13 of a semi-conductor wafer were connected [ one ] in the case of the above-mentioned conventional example, If the parallelism of the semi-conductor wafer 3 and the wafer chuck 4 is bad in case the semi-conductor wafer 3 is delivered to the wafer chuck 4 in a vertical or the flat surface near it, as shown in drawing 12 Clearance S is generated at the edge and sufficient adsorption power is not acquired, but when the worst, it may lead to fall of the semi-conductor wafer 3.

[0011] Moreover, although there was no risk of the above-mentioned fall when a semi-conductor wafer was conveyed by the level wafer chuck, there was a trouble that dispersion will arise in the insertion location to the wafer chuck of a semi-conductor wafer with lack of holding power.

[0012] This was also the same as when detaching and attaching the disc-like member to other semiconductor fabrication machines and equipment, such as etching and CVD (Chemical Vapor Deposition), further, when it performed the attachment and detachment to the mask chuck of a mask with the above-mentioned aligner.

[0013] Moreover, it is generated also when conveying substrates (plate-like member), such as an optical disk substrate and a liquid crystal substrate, in the predetermined location of chuck equipment, and the same problem has produced such a trouble in various fields.

[0014]

[Problem(s) to be Solved by the Invention] As mentioned above, when detaching and attaching a conventional plate-like sample to chuck equipment, when the parallelism of a sample and a chuck is bad, the trouble that dispersion will arise is in a chuck

location, and when the worst, with the CHAKU equipment of a vertical mold (\*\*\*), there is also a possibility that a sample may fall, especially.

[0015] The place which it was made in order that this invention might solve the above-mentioned trouble, and is made into the purpose is to offer the sample transport device which can be made to detach and attach certainly, without being influenced by parallelism, in case the sample on monotonous is detached and attached to chuck equipment.

[0016]

[Means for Solving the Problem] If it is in this invention in order to attain the above-mentioned purpose In the sample transport device to which a predetermined location to chuck equipment conveys a plate-like sample

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**DESCRIPTION OF DRAWINGS**

**[Brief Description of the Drawings]**

- [Drawing 1] The important section sectional view of the transport device concerning the 1st example of this invention.
- [Drawing 2] The important section sectional view in the condition of having stuck the 1st monotonous up material and chuck section in an example of this invention.
- [Drawing 3] The outline perspective view showing the modification of the elastic body concerning this invention.
- [Drawing 4] The outline perspective view showing other modifications of the elastic body concerning this invention.
- [Drawing 5] The important section sectional view of the transport device concerning the 2nd example of this invention.
- [Drawing 6] Important section rear view of the attaching part of the transport device concerning the 2nd example of this invention.
- [Drawing 7] The important section sectional view of the transport device concerning the 3rd example of this invention.
- [Drawing 8] The important section perspective view of the transport device concerning the 3rd example of this invention.
- [Drawing 9] The mimetic diagram showing the outline configuration of the aligner which was applied to the 3rd example of this invention and applied the transport device of this invention.
- [Drawing 10] The mimetic diagram showing the aligner with which the conventional transport device is applied.
- [Drawing 11] The important section sectional view of the conventional transport device.
- [Drawing 12] The important section sectional view in the condition of having contacted the conventional monotonous up material and the conventional chuck section of a transport device.

**[Description of Notations]**

- 3 Semi-conductor Wafer
- 4 Wafer Chuck
- 4a Chuck side
- 5 Mask
- 9 Arm for Conveyance
- 13 Attaching Part
- 14 Vacuum Adsorption Slot
- 15 Pipe for Evacuation
- 18 Notching
- 19 Elastic Body
- 20 Attaching Part
- 23 Arm for Conveyance
- 24 Elastic Body

[Translation done.]

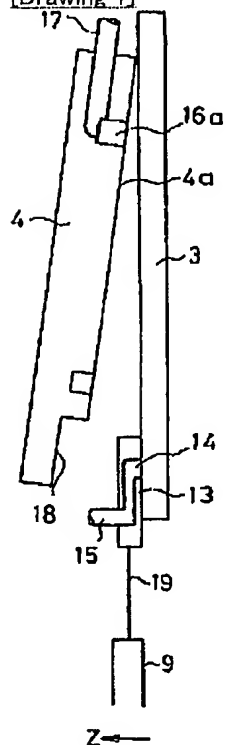
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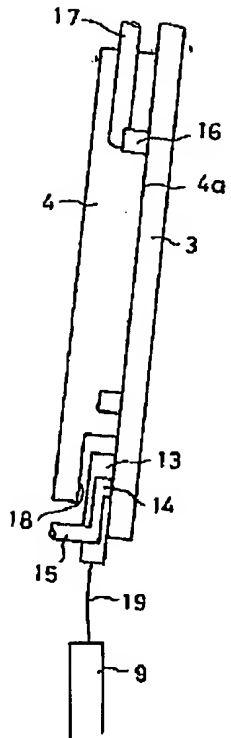
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**DRAWINGS**

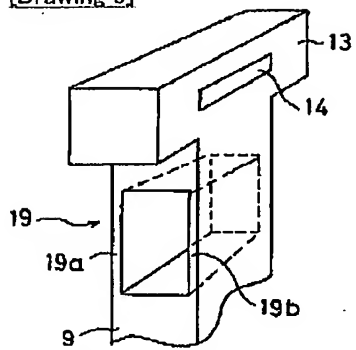
[Drawing 1]



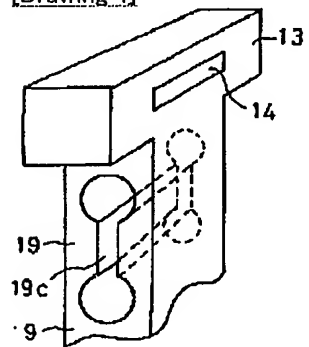
[Drawing 2]



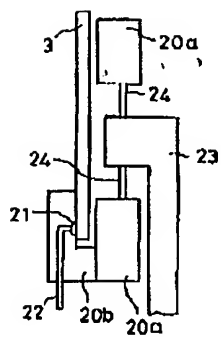
[Drawing 3]



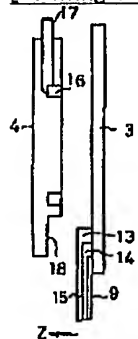
[Drawing 4]



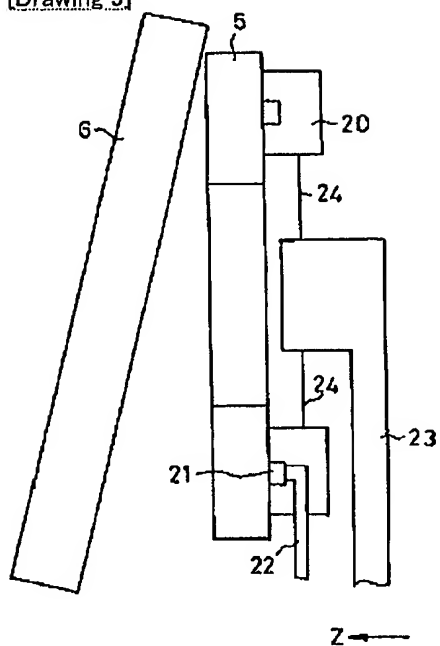
[Drawing 7]



[Drawing 11]

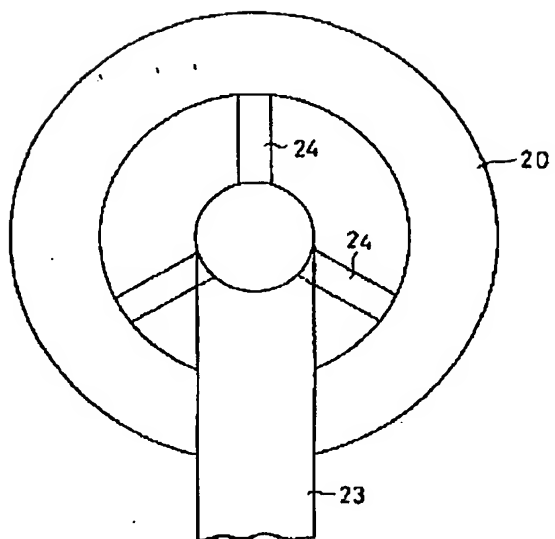


[Drawing 5]

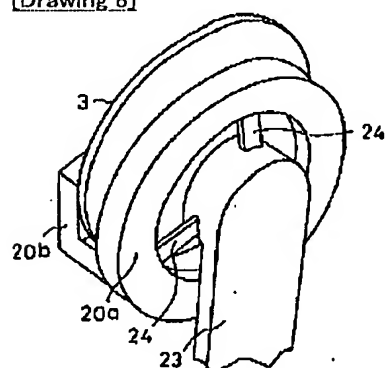


[Drawing 6]

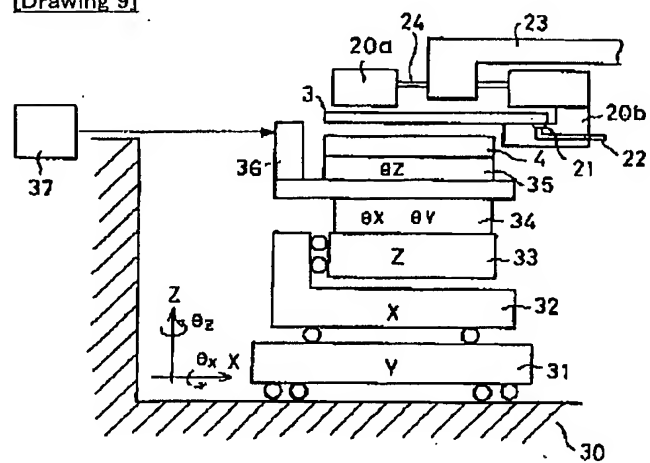




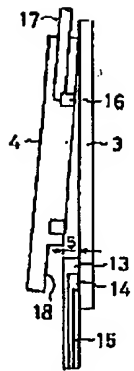
[Drawing 8]



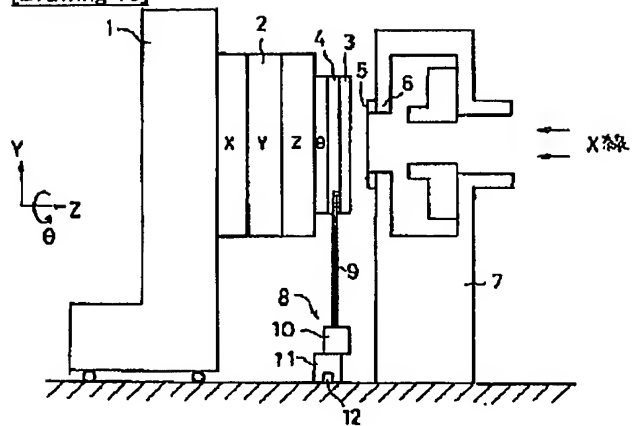
[Drawing 9]



[Drawing 12]



[Drawing 10]



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